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with which they may be in contact, that they can smell natural food, have a sense of taste for food, but that the sense of touch is most highly developed. Worms are omnivorous, eating meat as well as leaves. How great quantities of leaves they drag under the ground, and how they undermine stones, and triturate in their stomachs small particles of stone, and thus act as geological agents is shown in this remarkable book.

ENTOMOLOGY.[1]

RETARDED DEVELOPMENT IN INSECTS.[2] — In this paper the author records several interesting cases of retarded development in insects, whether as summer coma or dormancy of a certain portion of a given brood of caterpillars, the belated issuing of certain imagines from the pupa or the deferred hatching of eggs. One of the most remarkable cases of this last to which he calls attention, is the hatching this year of the eggs of the Rocky Mountain locust, or western grasshopper (*Caloptenus spretus*) that were laid, in 1876, around the Agricultural College at Manhattan, Kans. These eggs were buried some ten inches below the surface in the fall of 1876, in grading the ground around the chemical laboratory. The superincumbent material was clay, old mortar and bits of stone, and a plank sidewalk was laid above all. In removing and regrading the soil last spring, Mr. J. D. Graham noticed that the eggs looked sound and fresh, and they readily hatched upon exposure to normal influences, the species being determined by Professor Riley from specimens submitted by Mr. Graham. Remarkable as the facts are, there can be no question as to their accuracy, so that the eggs actually remained unhatched during nearly four years and a half, or four years longer than is their wont, and this suggests the significant question: How much longer could the eggs of this species, under favoring conditions of dryness and reduced temperature, retain their vitality and power of hatching?

Putting all the facts together, Mr. Riley concludes that we are, as yet, unable to offer any very satisfactory explanation, based on experiment, of the causes which induce exceptional retardation in development among insects. It is a very general rule that a rising temperature stimulates and accelerates growth, while a falling temperature retards and torpifies, and experiments recorded by the author[3] show that such is the case with regard to the eggs of *Caloptenus spretus*. But there are many strange exceptions to the rule. The eggs of crustaceans, as Apus and Cypris, are known to have the power of resisting drouth for six, ten or more years without losing vitality, while in some cases they seem actually to require a certain amount of desiccation before they will hatch. Yet the fact remains that different species act differently in this respect. In short, nothing is more patent to the observing naturalist than that species, and even individuals of the same species, or the progeny of one and the same individual act very differently under like external conditions of existence; or in other words, that temperature, moisture, food, etc., influence them differently. Hence—as has been shown by Semper to be the case with other animals, so it is with insects—changes in the external conditions of existence will not affect the fauna as a whole equally, but will act on individuals. We can understand how this great latitude in susceptibility to like conditions may and does in the case of exceptional seasons prove beneficial to the species by preserving the exceptional individuals that display the power to resist the unusual change, but we shall find ourselves baffled when we come to seek a demonstrable explanation of the cause or causes of such retardation, while the principles of evolution afford us the only hypothetical one at all satisfactory.

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[1] This department is edited by PROF. C. V. RILEY, Washington, D. C., to whom communications, books for notice, etc., should be sent.

[2] Abstract of a paper read before the Entomological Section of the A. A. A. S. at Cincinnati.

[3] 9th Rep. Ins. Mo.; also 1st Rep. U. S. Ent. Com.

In the innate property of organism to vary and in the complex phenomena of heredity, we get a glimpse at the cause—a partial explanation—of the facts of retarded development, for the exceptional tendency in the present may be looked upon as a manifestation, through atavism, of traits which in the past had been more commonly possessed and more essential to the species. This hypothesis is strengthened by the fact that the period of two, three or more years occupied in full development by exceptional individuals of a species which normally goes through its transformations within one year, is at the present day the normal period in other species belonging to the same natural order.

PREPARATION OF DIPTERA.—Prof. Joseph Mik, of Vienna, has, in the *Verhandlungen der K. K. zoologisch-botanischen gesellschaft in Wien* for 1880 (reprinted in Katter's Entomologische Nachrichten, 1881, pp. 189–206) an elaborate article on the Preparation of Diptera for cabinets, and we recommend a perusal of it to our dipterists, whether beginners or advanced students. It is evident from the paper that the proper preparation of Diptera for a cabinet, so as to render the specimens fit for scientific determination and study, requires more care and delicate manipulation than in any other order of insects. It is an art which can only be acquired by long practice, and we are glad that Professor Mik gives us the benefit of his life-long experience.

THE PERMANENT SUBSECTION OF ENTOMOLOGY AT THE RECENT MEETING OF THE A. A. A. S.[1]—Mr. Lintner's paper "on a remarkable invasion of Northern New York, by a Pyralid insect," gave a full and detailed account of the occurrence, to an injurious extent, in various counties of New York, of the larva of *Crambus vulgivagellus*, reciting the facts that have already appeared in our columns, in reference to this species and *Nephelodes violans*, but giving, in addition, very careful records of observations as to the habits of the former. On an island on the Roquette river, which had been absolutely denuded of grass, the worms had so thickly congregated under the shade of a solitary oak tree, that its base for about 18 inches was covered with a fine layer of silken web. The worms had evidently been forced, from sheer lack of food and shade, to migrate, and they naturally congregated under the first shade in their way, constantly spinning, as is their nature, until the compact web was formed. The term "invasion" as applied to the exceptional increase of this species seems to us unfortunate and to convey a wrong impression.

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[1] Concluded from p. 902.

Mr. Edwards's paper "on an alleged abnormal peculiarity in the history of *Argynnis myrina*," gave a number of facts from his own observations, which go to show that the history of this species, as well as that of *bellona*, as related by Mr. Scudder, in his recent work, was quite incorrect.

Mr. Cook, in his paper "on carbolic acid as a preventive of insect ravages," gave his experience with carbolic acid as an insecticide. By mixing two quarts of soft soap with two gallons of water, and adding one pint of carbolic acid in the crude state, and then diluting one part of this mixture to fifty parts of water, he found that he could protect his radishes from maggots, the flies being thereby kept away from them. He made the application once a week. He also found carbolic acid a good substitute for soft soap in protecting his apple orchard from borers. He gave further experiments to show the value of London purple as a preventive of the work of the apple-worm. In the discussion of this paper, Mr. Riley expressed his belief in the efficacy of London purple, for this purpose, but objected, on general principles, to its use on fruits, and particularly on the more mature apples as against the second brood of worms. He believed that knowledge of its use, would prejudice purchasers. Mr. Claypole coincided with these view. Mr. Cook argued that the danger was more imaginary than real, and cited several cases, where it had been extensively used with great benefit, and no ill results.

Mr. Claypole's paper on *Sericoris instrutana*, gave an interesting experience with the insect, showing how its larva destroys the leaf stem of the buckeye. In the vicinity of Yellow Springs, Ohio, it is a common annual occurrence that shortly after the leaves of the buckeye (*Æsculus glabra*) have unfolded in the spring, many of the leaves begin to droop and wither, and become conspicuous enough to catch the eye of ordinary observers. This results from the work of the larva of the Sericoris, which after burrowing in the leaf-stem lives in the faded and rolled-up leaf. Mr. Claypole's observations indicate but one annual brood, as no trace of injury is observable after the beginning of May. The work of this insect is exactly like that of *Proteoteras æsculana* Riley, on maple and buckeye, but as Mr. Claypole's specimens were determined by Professor Fernald, there can be no doubt about the species, notwithstanding *instrutana* is known to feed also on clover. The food-habit in the species is thus as diverse as it is, for instance, in *Psylla tripunctata* (in Homoptera), which breeds alike on the tips of Pinus and in the crimped leaves of Rubus.

In his paper on Syrian bees, Mr. Cook told how D. A. Jones, of Canada, and Frank Benton, of Michigan, went to Europe in search of new varieties of bees. They brought from Larnaca, Cyprus, both the Cyprian bee and the Syrian bee, and Mr. Benton went to Ceylon and Java, in search of other varieties. From the former place he brought two new species, *Apis dorsata* and *A. floreæ*, the former making immense combs exposed to the underside of branches, the latter a delicate and beautiful comb in the hollows of trees and rocks. In Java he failed to find "the great Java bee." With the Syrian bee, Mr. Cook has Syrianized the apiaries of the Michigan Agricultural College. The Syrians are of yellow type, closely allied to the Italian bee, which latter is probably a modified offspring of the Cyprians, which, in their turn, are also probable descendants of the Syrians. The Syrian bees are indefatigable workers, no matter what the clime to which they are exposed, or the season of the year. They are more irritable than other bees, especially when queenless, but Mr. Cook believes they are a great acquisition to American apiculture.

Mr. Mann's communication on "suggestions of coöperations in furthering the study of entomology," contained some remarks suggestive of the title and urging the foundation of libraries and indices to the contents of periodicals and society transactions, but was mainly a plea for the support of the Cambridge Entomological Club, and the organ of the club, *Psyche*. He set forth one aim of the club, which is worthy of commendation. Recognizing the difficulty which numerous students, and intending students of entomology in this country, find in purchasing for their own use the books they need, the club has decided to make of its library, as far as practicable, a national loan library of entomology, for which members of the club, and other persons showing a sufficient interest in entomology, should be entitled to borrow books, at the least possible cost to themselves. The effective carrying out of this plan, has, thus far, been greatly hampered by the very limited resources at the disposal of the club, and it was for assistance that the speaker made his appeal. If the *Psyche* drags, or fails to fulfill its original mission, the cause maybe found in the fact, that since it was started, much more thorough bibliographic serials, like the *Zoologische Anzeiger* and *Zoologische Jahresbericht* have appeared. It is certainly not for want of zeal on Mr.

Mann's part. He severely (and in our opinion, unjustly) criticized the managers of the American Entomological Society in Philadelphia, but we fear that no amount of criticism of other institutions, will make of the Cambridge Club the national institution Mr. Mann would desire, for the elements of nationality have so far been lacking.

Mr. Cook's paper entitled "How the Bee extends its tongue" was an illustration by means of diagrams of the manner in which the mouth-parts are first straightened by muscular action, and the ligula then protruded by the injection of liquids from ramose glands situated in the head and thorax.

Of Mr. Riley's papers, an abstract is given in this number of that on retarded development, and we hope to give abstracts of the others shortly.

ANOTHER HERBIVOROUS GROUND-BEETLE.—Complaint is made in Californian agricultural papers of the damage done to strawberry plants by a Carabid beetle. The beetle has been determined, by Mr. J. J. Rivers, curator of the University Museum, Berkeley, Cal., as *Anisodactylus confusus*. If this determination and the observations be correct, we shall have to add another Carabid to the list of species injurious to vegetation. We may remark here, by the way, that already in the Agricultural Report for 1868, Professor Glover records that *Harpalus caliginosus* had been taken in great numbers under wheat stacks in Maryland, and in open fields on timothy grass apparently feeding on the seeds.

A DISASTROUS SHEEP PARASITE.—Reports come to us of great injury to flocks in parts of Illinois by a parasite that is new to sheep raisers in that region. We have not yet seen specimens, but from the accounts and descriptions given, it is evidently what is known as the red-headed sheep louse (*Trichodectes ovis*). Mr. Daniel Kelly, of Wheaton, Illinois, an old time correspondent, found that by dipping the sheep in a wash made by Little's Chemical Dip, the animals were freed from the pest.

PHYLLOXERA NOT AT THE CAPE.—The commission appointed to inquire into vine diseases have concluded their labors and embodied their researches in a valuable and voluminous report. The commission are, however, anxious to say that their work is not yet completed, and that the present report is published mainly to satisfy the public mind on the question of the Phylloxera. Having heard positively that the Phylloxera existed on certain farms, the commission at once visited those places, and after painstaking examination have come to the conclusion that this disease does not exist in any of the places stated to contain it, nor have they discovered it on any of the farms they visited. In order to confirm their judgment they sent home through the instrumentality of the Government, specimens of rootlets, leaves and parts of the vines to Dr. Cornu, who is admittedly the first authority on the subject in Europe, and his opinion confirms the views of the commission in the amplest manner. Dr. Cornu says: "I made the most minute and careful survey of the vines said to be so affected, and came to the decided conviction that the Phylloxera did not exist on the vines in question."—*Eastern Province Herald, Port Elizabeth, Cape of Good Hope.*

RESISTANCE OF GRAPE-VINES TO PHYLLOXERA IN SANDY SOIL.—The immunity from the attacks of Phylloxera enjoyed by grape-vines when planted in sandy soil has long been known, and has been attributed to various causes. M. Saint-André, of Montpellier, France, discusses this subject in the *Messager Agricole* for May 10, 1881, and believes that neither the mobility nor the angulosity of the particles of sand, nor the absence of cavities, nor the chemical composition of sandy soil are sufficient reasons. Nor is the presence of a subterranean current of water in sandy soil an admissible reason, since it has been proven that the quantity of water contained in such soils at different depths and at different seasons is always smaller than that contained at the same period in other soils where the presence of Phylloxera renders the culture of the grape-vine impossible. He believes, however, that the circulation of water in the soil is a matter of the first importance in regard to the presence of Phylloxera, and that there exists a close relation between the resisting power of the vines and the capillary capacity of the soil. By this latter term he means the quantity of water which can be mechanically retained by a soil completely saturated with it. Where this capillary capacity of the soil is very small, the grape-vine enjoys absolute immunity from Phylloxera attacks; the more it increases the more the plants suffer. Sandy soil was found to possess the smallest capillary capacity, varying from 23 to 35.80 per cent., and in such soil the grape-vines are not only never attacked by Phylloxera, but the insect even disappears from infested plants when these are transplanted to such soils. Where the capillary capacity is above 40 per cent., the vineyards in France are rapidly disappearing under the attacks of the insect. Between the two limits above given, the plants suffer more or less. Exact figures cannot be given, as much depends on the resisting power of the different varieties of grape-vines and on the mode of cultivation. American resisting vines can be successfully cultivated in soils the capillary capacity of which attains, and even surpasses 45 per cent. Whether the diminished capillary capacity has a direct influence on the vitality of the Phylloxera, or whether through it the roots of the plant are enabled to resist the attack of the insect, is at present undecided.

While there is some plausibility in the theory advanced by M. Saint-André, we believe there are sufficient reasons to account for the diminished virulency of Phylloxera in sandy soil in its mechanical action upon the insect. Our own experiments with both

Phylloxera and many other insects in sand, prove conclusively that it is more difficult for such small, soft-bodied insects to make headway or to exist in sandy soil, not only because of the mechanical action of the particles adhering to all parts of the body, but because of the mobility of these particles and the absence of cracks, interstices and galleries which are formed in loamy or clayey soil, either by the penetration of roots, the effects of contraction during drought, or the action of the insects themselves.—*C. V. Riley in Farmers' Review.*

LOCUSTS IN THE WEST.—Mr. Uriah Bruner wrote us in September from the region of Denver, Colorado, that a few specimens of *Caloptenus spretus* were observed through that part of the country, but that they attracted no particular attention. The *Clifton* (Kansas) *Review* reports that they were seen flying southward over that town the last week of August, while other reports show that, just as we predicted would be the case, the pest was generally scarce in the West and did no damage. It was somewhat different on the Pacific coast. The Pacific migratory species *(Camnula pellucida)* was reported from Fresno as having been very thick on the plains and as doing much damage to vegetation about the middle of July, and we clip the following from the *Pacific Rural Press* of August 27th:

> "For the past three years this section has been afflicted by the grasshoppers. As a consequence the farmers have lost all their crops and got heavily in debt. From affluence several have been reduced to poverty. Last year the pestiferous insects laid immense numbers of eggs—in fact the earth was alive with them, and the outlook was very bad for this year, and many did not plant, preferring to let their land lie idle rather than raise a crop of 'hoppers. This season they hatched out in full force, but for some reason they seem to have been panic stricken, and have winged their way in clouds across the Sierras toward California. Only a few are left behind and they can do no particular damage. This year's crop will be a fair one, while next year the harvest ought to be immense. The destination of the pilgrim plague is not yet announced, but the hope is strong that they will be caught in the mountain fastnesses and perish miserably. If our California friends find them pouncing upon their fields, they may expect to see desolation and ruin left in their track."—*Reno Journal.*

Locusts were also very destructive this year in many parts of South America, and we have had several requests from that quarter for the publications of the U. S. Entomological Commission. In Europe, judging from reports, Turkey seems to have been overrun by what is evidently the common *migratoria*, the whole population of Smyrna being employed to combat them. At Angora, report says, "all business was suspended for three days by order of the Governor General, and all the inhabitants were ordered to march out into the fields to destroy the grasshoppers. Every inhabitant was compelled to deliver twenty oka (about fifty-six pounds) of dead locusts to the officials." The swarms are said to emanate principally from Persia.

STRUCTURE OF THE CLAW IN PSOCINA.—Dr. H. A. Hagen has, in *Psyche* for April, 1881, the first part of a paper entitled "Some

Psocina of the United States," in which he calls attention to the curious structure of the claws possessed by many Psocina. The basis of the claw is enlarged beneath in the manner of a blunt projection with what appear to be two strong bristles of unequal length. Under a strong magnifying power it appears, however, that the longer of these bristles is in reality a kind of hose or funnel, open at tip and finely striate. In a few instances Dr. Hagen observed in the interior of the funnel a large number of very fine threads ending in a little knob. The functional character of this structure remains unexplained.

INSECT COLLECTION FOR SALE.—The collection of Coleoptera of the late Mr. C. Trabant of New Orleans, who was a zealous and careful collector and student of insects, is offered for sale by his widow. We are informed that this collection consists of nearly 10,000 specimens, representing about 2000 species, and, from a sample box sent us, we can attest that the specimens are in fair condition and that the collection is well worth the low price ($200) asked for it, and which includes the cabinet. The whole cabinet consists of 40 large drawers, 26 of which are filled with North American beetles (chiefly from Louisiana, Mississippi and Texas), and 10 with Coleoptera from Europe. For further particulars apply to H. D. Schmidt, M. D., 263½ Canal street, New Orleans, La.

ANTHROPOLOGY.[1]

PROFESSOR BAIRD'S REPORT FOR 1880.—Owing to the great strain on the Government Printing Office at Washington, matter prepared for the press is compelled to lie for months before publication. This is true of the Smithsonian Annual Report. The matter was ready for the printer six months ago, but we have just received the preliminary pamphlet, and shall have to wait some weeks yet for the bound volume. The portions especially valuable to anthropologists in Professsor Baird's Report, are Cushing's explorations among the Indians of the Zuñi Pueblo, Capt. Bendire's researches in the Northwest, Boehmer's index to Smithsonian Publications in archæology and ethnology, Vol. XXII of Contributions to Knowledge (containing Jones' "Explorations of the aboriginal remains of Tennessee;" Habel's "Sculptures of Santa Lucia Cosumalwhuapa in Guatemala;" Charles Rau's "Archæological collection of the United States National Museum;" Charles Rau's "Palenque Tablet," and W. H. Dall's "Remains of later prehistoric Man obtained from the caves in the Catharine archipelago"). Further notes will be found upon the antiquities of Antigua and Guadaloupe, and upon the Annual Report of 1879.

PEABODY MUSEUM OF AMERICAN ARCHÆOLOGY AND ETHNOLOGY. —The fourteenth annual report of this famous institution, marked

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[1] Edited by Professor OTIS T. MASON, 1305 Q. street, N. W., Washington, D. C.